

**LESA
Mathematics Curriculum
2007**

1. Number Sense and Operations

(NCTM 2000 #1; MO #5 & 9; IL #6)

A. Demonstrate knowledge and use of numbers: representations, systems, and relationships.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - convert between standard notation and scientific notation.

The students will change large distances, such as stars, planets, and numbers less than one, such as size of bacteria and cells into scientific notation. Students will also find scientific notation used in text books and other media to convert to standard notation.

Monitor student work, written assignments, and tests.

2 - use ratio, proportions, and percents.

2a. The teacher will analyze a circle graph and discuss parts and whole.
2b. The students will determine proportions and percents of m&m's in a package.

Make a circle graph from the data collected.

3 - identify numbers and their opposites and use absolute values.

3a. The teacher will talk about distance on a number line.
3b. The students will use a checkbook to calculate balances using deposits and withdrawals.
3c. Football measurements
3d. The rise and fall of temperatures.

Written assignments, drawing a picture of a given situation

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Mathematics Curriculum
2007**

B. Demonstrate knowledge of operations, properties, and their relationships.

<u>Objective</u>	<u>Suggested Activities</u>	<u>Suggested Assessment</u>
The student will be able to: 1 - identify and apply various properties of addition, subtraction, multiplication, and division.	1a. The teacher will work problems on the board. 1b. The students will complete various worksheets that use the commutative, associative, identity, distributive, and zero properties, and use manipulatives to show the different properties.	Written assignments and tests
2 - manipulate squares and square roots.	2a. The teacher will work problems on the board. 2b. The students will complete various worksheets that use squares and square roots.	Written assignments and tests
3 - identify the order of operations.	3a. The teacher will work problems on the board. 3b. Use various worksheet and homework assignments highlighting order of operations.	Written assignments and tests

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2007**

C. Demonstrate fluency in computation and make appropriate estimates.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - correctly solve number operations with rational numbers.

3a. The teacher will work problems on the board.
3b. Use various worksheet and homework assignments highlighting order of operations.

Written assignments and tests

2 - distinguish when to use precise measurement of numbers and when estimation is acceptable.

2a. The students will create a timeline incorporating different units of time.
2b. Divide students into groups and have various types of food to be divided among the group - have students decide if they can use precise measurement or estimation, discuss various situations involving when it is necessary or appropriate to know precise measurements vs. estimation.

2a. Written assignments involving problem solving
2b. Evaluate the timeline.
2c. Create a web for situations involving precise measurement and estimation.

3 - convert between fractions, decimals, and percents.

The students will create a table to show conversions from one form to the others.

Written assignments and tests

4 - use prime factorization to find GCF and LCM.

4a. The teacher will model correct computation.
4b. Students may use individual white boards to practice problems.

Written assignments and tests

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2007**

2. Patterns, Relationships, and Algebraic Methods

(NCTM 2000 #2; MO #8; IL #8)

A. Describe numerical relationships using patterns and functions.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - identify variables and what they represent.

The teacher will initiate classroom discussion.

Written assignments and tests

2 - recognize and complete the pattern.

2a. Classroom discussion, followed by students creating their own number patterns and having classmates solving those problem (snowball).
2b. Create a tessellation.

2a. Written assignments and tests
2b. View tessellations. Check patterns created by students.

3 - decide whether or not a set of numbers is a function.

3a. Describe a function to the class.
3b. Have students create functions to be checked by peers.

Journal entry writing the steps of decision-making using the language of math

B. Describe numerical relationships using mathematical models.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - solve and graph equalities and inequalities on a number line.

1a. Classroom discussion
1b. Work problems on the board.
1c. Use individual dry erase boards.

Monitor student progress.

Grade level: Pre-Algebra

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2007**

2 - graph data sets and equations on a coordinate plane.

Use smart board to show examples of a coordinate plane with equations. Allow students to do examples.

2a. Written assignments and tests
2b. Monitor student progress.

3 - use symbolic algebra to represent and explain mathematical relationships.

Change word problems into the language of algebra.

Written assignments and tests

C. Analyze, interpret, and solve problems using algebraic concepts and expressions.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - demonstrate how to correctly solve equations.

Teacher models solving equations on board, and students use manipulatives to model equality.

1a. Monitor student progress.
1b. Written assignments and tests

2 - solve problems using formulas.

2a. List formulas on board and model correct use.
2b. Have students make posters and mount on wall.

2a. Check student posters for accuracy.
2b. Written assignments and tests
2c. Have students make a journal entry listing the correct steps - check for accuracy.

Grade level: Pre-Algebra

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D. Analyze change in various contexts.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - identify constant rates of change.

1a. Look at a variety of graphs to point out rates of change including positive change and negative change.

1b. Use a bacteria reproduction model to show change over time. Tie this lesson into current science subjects.

1c. Have students identify rates of change and construct graphs to show the constant rate of change.

Check graphs, written assignments and tests.

2 - determine the slope and intercepts of a line on a graph.

Looking at a line graph, discuss rise, run, slope, and x and y intercepts.

Written assignments and tests

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(NCTM 2000 #3; MO #6; IL #9)

3. Geometry

A. Analyze characteristics and properties of geometric shapes and develop mathematical arguments about geometric relationships.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - identify and draw examples of points, lines, line segments, rays, angles, planes, parallel lines, perpendicular lines, intersecting lines, transversal, and congruence.

1a. Show proper examples on smart board. Students draw examples on individual boards.
1b. Use maps to show roads that are parallel, perpendicular, and/or intersecting.
1c. Use transparencies to show congruence.

1a. Draw a web and list examples of congruence in nature, real life, etc.
1b. Monitor student work.
1c. Students draw maps of the neighborhood and identify geometric shapes.

2 - create and name the different types of angles.

2a. Display types of angles on the smart board or white board, identify angles in the classroom, books, pictures and identify them as acute, right, obtuse, or straight.
2b. Students draw and label examples of each angle.
2c. Students use a protractor to construct, measure, and label examples of each angle.

2a. Monitor student work and check for accuracy.
2b. Have students monitor peer work.
2c. Work in groups to create a slide show identifying the different angles.

3 - describe and name geometric figures.

3a. Use a table to organize and categorize geometric figures.
3b. Take a scavenger hunt around school to find geometric figures.
3c. Identify sets and subsets of figures.

Monitor student work, written work, and tests.

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B. Specify locations and describe spatial relationships using representational systems.

Objective

The student will be able to:

1 - identify and draw examples of points, lines, segments, rays, lines, angles, planes, parallel lines, perpendicular lines, intersecting lines, transversal, and congruence on a coordinate plane.

2 - use coordinate geometry to represent and examine the properties of geometric shape.

Suggested Activities

1a. Show proper examples on smart board. Students draw examples on individual boards.
1b. Use maps to show roads that are parallel, perpendicular, and/or intersecting.
1c. Use transparencies to show congruence.
1d. Use art example to show congruence of objects.

2a. Draw shapes on graph paper and count squares for area and perimeter.
2b. Construct 3-dimensional shapes from graph paper and count squares for surface area and perimeter.
2c. Use the smart board to model shapes on the coordinate plane and identify features in each object.
2d. Have students construct figures on a coordinate plane and label features.

Suggested Assessment

1a. Draw a web and list examples of congruence in nature, real life, etc.
1b. Monitor student work.
1c. Students draw maps of the neighborhood and identify geometric shapes.

2a. Monitor student work. Check constructed figures for accuracy.
2b. Supply groups with dimensions and have the groups construct the figures and identify properties.

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2007**

C. Apply transformations and use symmetry to analyze mathematical situations.

Objective

The student will be able to:

1 - identify and create reflections, translations, rotations.

Suggested Activities

- 1a. Use mirrors in class to demonstrate reflections.
- 1b. Students use transparencies to model reflections, translations, and rotations.

Suggested Assessment

Create an art project showing reflections, translations, and rotations.

D. Use visualization, spatial reasoning, and geometric modeling to solve problems.

Objective

The student will be able to:

1 - solve problems involving the Pythagorean theorem.

Suggested Activities

- 1a. Demonstrate the theorem on the board while students use graph paper to determine lengths.
- 1b. Find rectangles around school and have students calculate the hypotenuse.
- 1c. Have students develop word problems based on the theorem for peers to solve.

Suggested Assessment

- 1a. Monitor student work, written assignments and tests.
- 1b. Have students make a journal entry explaining the steps in solving the word problem.

2 - use scale factors to compare real life images to visual representation.

- 2a. Use maps to demonstrate distance.
- 2b. Use descriptions of items from a catalog and have students measure the real life image.

Students create a map of their room using an appropriate scale.

Grade level: Pre-Algebra

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3 - draw 3-dimensional shapes on a 2-dimensional plane.

3a. Use isometric dot paper to draw 3-dimensional figures.
3b. Find 3-dimensional figures drawn in books, magazines, or advertising.

3a. Check student work for accuracy.
3b. Develop an art project showing 3-dimensional objects

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4. Measurement

(NCTM 2000 #4; IL #7)

A. Determine measurable attributes of objects and the units, systems, and processes of measurement.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - understand, select, and use units of appropriate size and type to measure angles, perimeter, area, surface area, and volume.

1a. Model measurement on smart board or other media. Use objects around school to measure with appropriate units.
1b. Make posters displaying the proper use of units.

Given word problems, students should be able to use appropriate units to answer the questions.

B. Apply appropriate techniques, tools, and formulas to determine measurements.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - convert between units of measure.

1a. Model unit multipliers for student understanding.
1b. Use objects in the classroom and convert measurements into different units.
1c. Use a map to convert distances from miles to kilometers.
1d. Find temperatures of world cities and convert between Fahrenheit and Celsius.

1a. Monitor student work for accuracy.
1b. Written assignments and tests

Grade level: Pre-Algebra

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Mathematics Curriculum
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2 - use rulers and protractors to determine and compare measurements.

3 - represent and solve problems involving length, width, height, perimeter, circumference, area, surface area, and volume.

Measure common items and angles using rulers and protractors.

3a. Use a variety of objects and areas of the school for student measurement.

3b. Measure circumference with a string and measure string for length.

3c. Provide a variety of objects for students to measure, students measure each basic shape to demonstrate concepts.

Written work and tests

3a. Written assignments and tests

3b. Monitor student progress through the correct construction of manipulatives and accurate measurements.

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Mathematics Curriculum
2007**

5. Data Analysis and Probability

(NCTM 2000 #5; MO #7; IL #10)

A. Formulate and answer questions by collecting and organizing data and communicate findings.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - determine the difference between the types of sampling.

Collect different types of sampling from within the school and discuss bias, populations, and characteristics between and within populations.

Students will create a presentation explaining sampling techniques and discuss reasons for their choices.

2 - formulate questions and design studies to compare members of a group.

Working as a group, have students design a question that can be answered and display results in a graph.

Observation, group work

3 - collect and organize data into stem-and-leaf plots and other various types of graphs.

Use data already collected in sampling to create graphs and stem-and-leaf plots, collect and organize data from peers, (i.e., age, phone numbers, number of siblings).

Display graphs with explanations.

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B. Use appropriate statistical methods to analyze data properly.

Objective

The student will be able to:

1 - describe tendencies of data.

Suggested Activities

Collect data from students and analyze using appropriate methods like mean, median, mode, range, and displaying results with the appropriate graph (scatterplot, histograms, box plot, etc.).

Suggested Assessment

- 1a. Monitor student work.
- 1b. Check graphs for accuracy.

C. Develop and evaluate inferences and predictions that are based on data.

Objective

The student will be able to:

1 - use data to predict possible outcomes.

Suggested Activities

Collect data from students and predict possible outcomes from the data using appropriate terminology including complementary and mutually exclusive events, proportionality, etc.

Suggested Assessment

Have students collect and organize data, using a tree diagram, list, or area model, and predict possible outcomes in a presentation form.

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2007**

D. Understand and apply basic concepts of probability.

Objective

The student will be able to:

1 - calculate probabilities and relative frequencies in a situation with known numbers of outcomes.

Suggested Activities

Roll the dice or flip coins and calculate probabilities with students.

Suggested Assessment

Students will journal and explain the relationship of frequencies to the outcomes.

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Mathematics Curriculum
2007**

6. Discrete Math

(MO #10)

A. Apply systematic listing, counting, and reasoning.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - look at if-then relationships to make logical deductions.

1a. Model if-then examples and have students create a list of if-then statements appropriate for the classroom.
1b. Find and list if-then statements found in newspapers, magazines, etc.

Place if-then statements on a poster for display in the classroom.

2 - determine and display the number of possibilities in a given situation.

Students create a tree diagram from given information, solve the problem using multiplication, and display using method of choice.

2a. Students explain and discuss steps cooperatively using the language of math.
2b. Observation

B. Apply discrete mathematical modeling using graphs and trees.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - explore transportation networks.

Gather bus, train, or airplane schedules and have students plan a trip. If possible, take the trip.

Check trip plans for accuracy. Have students present schedules in chronological order to the class in any presentation form.

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Mathematics Curriculum
2007**

C. Use iterative (repetitive) patterns and processes.

Objective

The student will be able to:

1 - determine and continue a pattern using inductive reasoning.

Suggested Activities

- 1a. Use standardize test practice to model appropriate techniques.
- 1b. Have students develop patterns to be given to peers for completion.

Suggested Assessment

Monitor student progress.

D. Organize and process information.

Objective

The student will be able to:

1 - investigate tree, Venn, or student-developed diagrams as an organizing tool for problem solving.

Suggested Activities

- 1a. Model proper use of graphic organizers.
- 1b. Supply information to students and have the students choose the appropriate diagram and display the information in the diagram.

Suggested Assessment

Check student diagrams for accuracy.

Grade level: Pre-Algebra

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2007**

E. Find the best solution to the problems using algorithms.

Objective

The student will be able to:

1 - create algorithms based on constructing meaning from explorations.

Suggested Activities

Students in groups solve problems and explain methods to the class. Discuss the methods to choose the most efficient method and attempt to generalize in order to apply to other situations.

Suggested Assessment

Monitor student progress.

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2007**

7. Problem Solving and Reasoning

(NCTM 2000 #6 & 7a;
MO #1 & 3 ; IL #1)

A. Apply and adapt appropriate strategies to solve problems.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - apply the general strategies of problem solving.

Present problem-solving strategies to students. Students create problems and have peers or other groups determine which strategies to use.

Students make a journal entry, listing the possible strategies and explaining when and how they can be used.

2 - demonstrate critical thinking skills and reasoning.

Present the students, individually or in groups, with problems from other subjects or everyday life and have them apply strategies to solve the problems.

Given a variety of problems, the students should be able to solve the problems, written work and tests.

3 - decide if the answer given is reasonable and explain why or why not.

Model for the class, problems with reasonable answers. Solve problems individually and in groups.

Written work and tests

Grade level: Pre-Algebra

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2007**

B. Use reasoning to build new mathematical knowledge through problem solving.

Objective

The student will be able to:

1 - use simple mathematical strategies to solve complex problems.

Suggested Activities

Present complex problems to the class and solve using simple strategies, such as problems using tree diagrams that can be solved using multiplication.

Suggested Assessment

Written work and tests with complex problems

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8. Communication

(NCTM 2000 #7b, 8, & 10;
MO #2; IL #2, 3, & 4)

A. Work both cooperatively and individually.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - solve problems individually.

Present problems to the students to individually solve.

Written work and tests

2 - solve and discuss problems cooperatively.

Students can create a game to play cooperatively to solve problems.

1a. Evaluate games presented to the class.
1b. Observation

B. Represent mathematical data and concepts using a variety of media, including technology.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - display data in a spreadsheet.

Have samples of spreadsheets and present them to the class. Demonstrate using a spreadsheet to the class. Have students collect data and enter data into a spreadsheet for display.

Evaluate spreadsheets.

2 - display data in a computerized graph.

Demonstrate using the data to create a computerized graph. Have students collect data and make a computerized graph.

Evaluate graphs.

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2007**

C. Analyze, evaluate, and communicate mathematical thinking using the language of mathematics coherently and clearly.

Objective

Suggested Activities

Suggested Assessment

The student will be able to:

1 - write expressions and equations in sentence form.

1a. Write examples on board of mathematical expressions and equations and their equivalents in sentence form.
1b. Have students find sentences from magazines and newspapers and translate the sentences into expressions and equations.

1a. Evaluate student work.
1b. Written work and tests

2 - explain the steps to solve a problem.

Model the steps to problem solving on the board, present problems to the students, and have them work the problems orally.

Have students make a slide show presentation on the steps to problem solving. Then, evaluate the show.

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2007**

(NCTM 2000 #9; MO #4; IL #5)

9. Connections

A. Use technology to access and process information.

Objective

The student will be able to:

1 - use a computer or calculator to gather and process information to create charts, tables, and graphs.

Suggested Activities

Have students use the computer to gather, organize, and display data for other content areas problems.

Suggested Assessment

1a. Students present a slide show using the language of math.
1b. Observation

B. Understand how mathematical ideas connect internally, among other disciplines, and in daily life to build on one another and produce a coherent whole.

Objective

The student will be able to:

1 - identify mathematical ideas in other subject matter.

2 - create a spreadsheet using the computer.

Suggested Activities

Students will use textbooks from other content areas and find examples of math to be presented to the class.

The teacher has samples of spreadsheets and present them to the class. Demonstrate using a spreadsheet to the class. Have students collect data and enter data into a spreadsheet for display.

Suggested Assessment

Monitor student progress and observe presentations.

Check spreadsheets for accuracy.

Grade level: Pre-Algebra

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Mathematics Curriculum
2007**

3 - identify mathematical ideas in daily life.

3a. The teacher finds examples of math from outside the school and shares with the students.

3b. Have students keep track of calories eaten at meals.

3c. Have students list jobs that involve math.

The students will present data in a graphic organizer. Observe and evaluate the organizer.